

# Isolated myocardial abscess cavity: An incidental finding on intraoperative transesophageal echocardiography

Mukesh Garg, Jyotsna Bhargava<sup>1</sup>, Madhuri Garg<sup>2</sup>, Sukhdev Garg<sup>3</sup>

Department of Cardiac Anaesthesia, Jeevan Rekha Superspeciality Hospital, Central Spine, Jagatpura, Jaipur, <sup>1</sup>Department of Anaesthesia, Fortis Escorts Hospital, Malviya Nagar, Jaipur, <sup>2</sup>Department of Anaesthesia, SMS Medical College, JLN Marg, Jaipur, <sup>3</sup>Department of Cardiac Anaesthesia, Fortis Escorts Hospital, Malviya Nagar, Jaipur, Rajasthan, India

## ABSTRACT

Myocardial abscess is a suppurative infection of myocardium, endocardium, native or prosthetic valves, perivalvular structures and cardiac conduction system. It develops in about 20% of patients with infective endocarditis. Due to avascular and fibrous structures, valvular regions are commonly involved. More precisely, aortic valve (AV) rings area; native or prosthetic valve is usually affected. Occurrence of myocardial abscess within free wall of the left ventricle (LV) without any evidence of infective endocarditis is a rare phenomenon; and infrequently reported in medical literature. We report a case of myocardial abscess cavity within the anterior wall of the LV, in a patient who underwent open heart surgery for severe AV stenosis. This was an incidental intraoperative transesophageal echocardiography (TEE) finding without any other evidence of infective endocarditis. The stenotic AV was replaced, along with surgical drainage and closure of the cavity. Postoperatively, patient was managed on empirical antibiotics according to infective endocarditis guidelines.

**Keywords:** AV, fistula, infective endocarditis, pseudoaneurysm, transthoracic echocardiography

**Address for correspondence:** Dr. Mukesh Garg, Department of Cardiac Anaesthesia, Jeevan Rekha Superspeciality Hospital, Central Spine, Jagatpura, Jaipur - 302 025, Rajasthan, India.  
E-mail: drmukesh7777@gmail.com

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## INTRODUCTION

Myocardial abscess is a rare and potentially fatal condition. Various case reports have revealed the presence of myocardial abscess at different anatomic locations of the myocardium, including atria auricles,<sup>[1]</sup> ventricular free wall,<sup>[2]</sup> interventricular septum,<sup>[3]</sup> and perivalvular region.<sup>[4]</sup> Myocardial abscess has been reported in about 20% patients of infective endocarditis, which is the most common predisposing factor.<sup>[5]</sup> Occurrence of myocardial abscess without any evidence of infective endocarditis is a rare finding and infrequently reported in medical literature. We report a case of myocardial abscess within anterior

wall of the LV that was incidentally detected during intraoperative TEE, in a patient scheduled for stenotic AV replacement.

## CASE REPORT

A 47-year-old man presented with the complaints of progressive breathlessness and chest discomfort. Preoperative transthoracic echocardiography (TTE) showed a bicuspid AV with severe stenosis and moderate regurgitation. The LV was dilated with mild systolic dysfunction (ejection fraction: 45–50%), with no other abnormality. Coronary angiography revealed normal coronary arteries. Patient was scheduled for an elective AV

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replacement surgery. After placing the standard monitoring as per ASA guidelines, the patient was induced with titrated doses of intravenous fentanyl, rocuronium, and propofol. Throughout the surgery, depth of anesthesia was maintained with intermittent doses of intravenous fentanyl, vecuronium, and midazolam, in addition to sevoflurane as an inhalational agent. Intra-operative TEE confirmed pre-operative findings. The midesophageal two-chamber view showed a hypoechoic abnormality in the basal anterior segment of left ventricle. It was approximately 30–22.6 mm echo-free space [Figure and Video 1]. The echo-lucent defect with well-defined margin looked like an old healed myocardial abscess cavity. The same abnormality was also appreciated in the transgastric two-chamber view [Figure and Video 2].

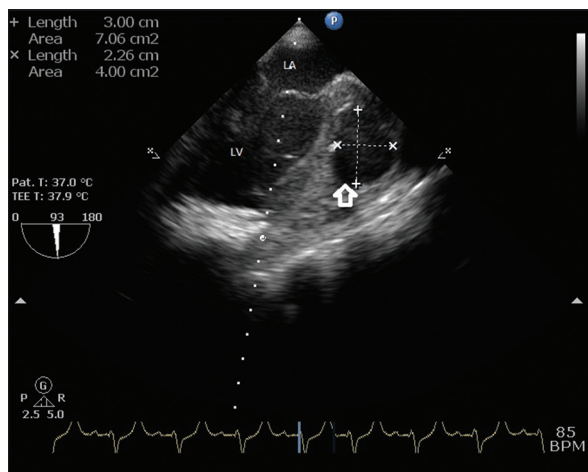
This new finding was conveyed to the operating surgeon, who found a communication underneath the left coronary cusp of AV. The abscess cavity was debrided of friable margin (material sent for culture sensitivity) followed by closure with dacron patch. The diseased AV was replaced with a bi-leaflet mechanical valve. The patient was weaned off cardio-pulmonary bypass uneventfully. The hemodynamic parameters were maintained within normal range by using intravenous inotropes infusion of epinephrine (0.08  $\mu\text{g/kg/min}$ ) and dobutamine (2  $\mu\text{g/kg/min}$ ). Three sets of blood cultures were drawn from different sites of the patient. As per unit protocol, the patient was getting intravenous cefuroxime (1.5 g twice a day) since admission, but considering abscess cavity, antibiotic coverage was stepped up to intravenous cefoperazone-sulbactam (1.5 g twice a day) and amikacin (500 mg twice a day). Although, all three blood cultures did not show any growth and were

reported negative, the empirically commenced antibiotics were continued for 10 days. Post-operative course of the patient remained uneventful.

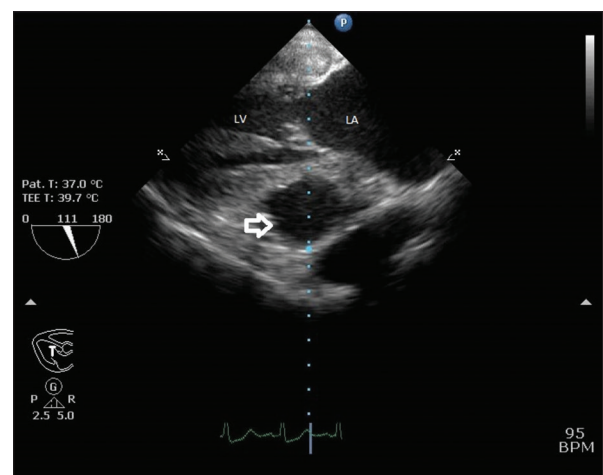
## DISCUSSION

Myocardial abscess is a suppurative infection of the heart and it is usually associated with infective endocarditis. The predilection sites of myocardial abscess are heart valve ring areas, especially AV region (native or prosthetic valve); probably, because these areas are fibrous and relatively avascular.<sup>[6]</sup> Nonvalvular isolated mural abscess is a rare condition and can be found in the setting of septicemia without infective endocarditis. Following a detailed literature research, it has been found in relation to septic foci such as decubitus ulcer, infected burns, bronchiectasis, and thrombophlebitis in patients with immunodeficiency.<sup>[7]</sup> Moreover, one case report demonstrated myocardial abscess at the site of infarcted myocardium.<sup>[8]</sup> None of the aforementioned conditions existed in our patient.

The pathophysiology of an isolated myocardial abscess without infective endocarditis is quite different. Unlike the routine course of endocarditis, an isolated myocardial abscess is anatomically not associated with valvular annulus, and occurs when bloodstream infection causes focal bacterial myocarditis that progress to liquefactive necrosis.<sup>[9]</sup> There are two principle ways of myocardial abscess formation: (1) by dissemination from a distant infectious focus via coronary embolization of septic material; (2) by contiguity from a process located in the heart itself. The rarity of an isolated myocardial abscess without any association with endocarditis, suggests that myocardium is relatively impervious to bloodstream



**Figure and Video 1:** Midesophageal two-chamber view showing echolucent lesion (arrow) with well-defined border of myocardium at the basal segment of left ventricle anterior wall (maximal size 30–22.6 mm). LA: Left atrium, LV: Left ventricle



**Figure and Video 2:** Transgastric two-chamber view showing same clear free-space lesion (arrow) with border of myocardium at the basal segment of left ventricle anterior wall. LA: Left atrium, LV: Left ventricle

inoculation. This is supported by the fact that myocardial abscess is usually associated with impaired local immunity, involving either a fresh infarct, the scar from an old infarct; or a coronary stent.<sup>[10]</sup>

In the past, most cases of myocardial abscess were detected during autopsy. But nowadays, prior detection of a myocardial abscess can be carried out by noninvasive diagnostic modalities including echocardiography, computed tomography scan, and cardiac magnetic resonance imaging. Despite advances in diagnostics, identification of myocardial abscess still remains a challenge. This could be ascribed to a low index of disease suspicion as well as low sensitivity of the available diagnostic measures. Echocardiography is accepted as a non-invasive gold standard technique to detect infective endocarditis and myocardial abscess. TEE has an improved sensitivity (90%), in comparison to the TTE (50%). In addition, transesophageal approach provides better detection of perivalvular abscesses, associated vegetations, valvular perforations, fistulae and rupture of chordae tendineae; especially in mitral prosthetic valves. Although, specificity higher than 90% has been reported for both the approaches, TEE always needs to be performed, whenever an abscess is suspected on TTE. However, small anterior abscesses sometimes difficult to diagnose by transesophageal approach, may be better evaluated only by TTE. Consequently, both approaches are complimentary to each other and mandatory in suspected patients. On echocardiography, myocardial abscess appears either as a thickened and non-homogenous echo-dense area, due to suppuration in early stage; or echo-lucent and clear free-space in old healed stage. In the healed stage, echocardiography typically shows a zone of reduced echo-density without any color flow, makes the diagnosis easy.<sup>[11]</sup> Exact morphologic evaluation including volume and extent of the abscess, and relation with the coronary arteries is mandatory to plan the management of disease. The complications of myocardial abscess, like pseudoaneurysm and fistulization, may also be diagnosed by TEE. The typical echocardiographic appearance of a pseudoaneurysm is a pulsatile echo-free space with color Doppler flow inside. The formation of a fistula may be a complication of both abscesses and pseudoaneurysm.

The clinical picture of a patient with myocardial abscess may vary from an asymptomatic state to myocardial wall rupture. On investigation, as in the present case, ECG usually does not show any specific changes. However, according to literature few cases have presented with fatal arrhythmia (ventricular tachycardia or fibrillation); PR prolongation, and may have complete heart block.<sup>[12]</sup> Management of patients with myocardial abscess depends

upon clinical and imaging features along with complications. Management varies from intensive medical treatment with antibiotics to surgical abscess drainage and repair of the defect. Many patients present with smaller abscesses without any complications. Therefore, it has been suggested that such patients must be monitored closely, with serial TEE at intervals of 2, 4, and 8 weeks after completion of antimicrobial therapy.<sup>[13]</sup> According to literature review, about 40% of cases involve more than one microbial etiology in myocardial abscess and that gram negative infections are often related to debilitating conditions.<sup>[14]</sup> Bacterial agents usually implicated are *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Escherichia coli*, *Klebsiella*, *Streptococcus viridans*, and *Salmonella* species.<sup>[15]</sup> Accordingly, we used third generation cephalosporin with  $\beta$ -lactamase inhibitor along with aminoglycoside as an empirical antibiotic.

## CONCLUSION

This was a rare case of isolated myocardial abscess in the free wall of left ventricle without any other evidence of infective endocarditis, an incidental finding during intraoperative TEE and managed successfully. Hence, it demonstrates the utility of intraoperative TEE in detection of additional findings during open heart surgery, which are often overlooked during preoperative TTE.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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## Conflicts of interest

There are no conflicts of interest.

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